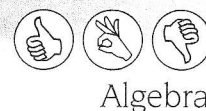


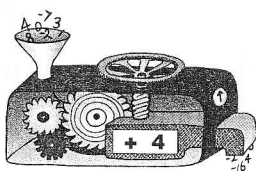
80 Relations



A In and Out

A relation is a pattern in which two numbers are linked by a rule.

- 1 This *Number Cruncher* is programmed to add 4 to each number that is put in. Complete the table.



Rule : + 4	
IN	OUT
0	
5	
-1	
-100	

2a)

Rule : $\times 7$	
IN	OUT
2	
12	
	21
	63

b)

Rule : first - 3 then $\times 4$	
IN	OUT
5	
14	
	20
	100

c)

Rule : first $\div 2$ then + 1	
IN	OUT
6	
28	
	21
	36

d)

Rule : first + 1 then $\div 2$	
IN	OUT
25	
47	
	9
	1

- 3 Find possible rules for each of these tables.

a)

Rule : first then	
IN	OUT
0	1
4	9
11	23
43	87

b)

Rule : first then	
IN	OUT
5	2
11	4
26	9
29	10

B Writing Rules

The rules for the number cruncher can be written with symbols. For instance instead of 'add 6 then multiply by 5' we could write $OUT = (IN + 6) \times 5$

- 1 Write each rule using symbols. Use brackets when needed.

- a) 'Multiply by 7'

OUT =

- b) 'Take away 3, then multiply by 4'

OUT =

- c) 'Divide by 2, then add 1'

OUT =

- d) 'Add 1, then divide by 2'

OUT =

If we use the letter **n** for the number going IN and the letter **t** for the number coming OUT, then ...

$OUT = (IN + 6) \times 5$ can be written as $t = (n + 6) \times 5$

- 2 Rewrite the four number cruncher rules in question 1 using **n** and **t**.

- a)

- b)

- c)

- d)

- 3 Fill in the number cruncher tables.

a)

$t = 5 \times n + 1$	
n	t
8	
12	
	36
	101

b)

$t = 2 \times (n - 7)$	
n	t
7	
45	
	28
	200

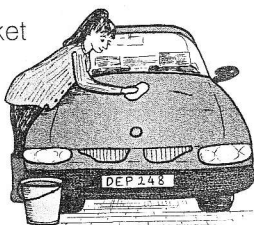


Algebra

Writing a Formula 81

A P is for Pocket Money

- 1 Rimini gets 50 cents for every chore she does at home.
 - a) Calculate Rimini's pocket money for a week in which she did 7 chores.
.....
 - b) Use c for the number of chores done this week to write a rule for Rimini's pocket money.
 $p =$
 - c) Last week Rimini got \$11.50 pocket money.
How many chores did she do?
- 2 Brett gets \$5 per week plus a dollar each time he washes the dishes after dinner.
 - a) How much is Brett's pocket money for a week in which he did the dishes 4 times?
.....
 - b) Write a formula for Brett's pocket money, use n for the number of times he washed the dishes after dinner.
 $p =$
 - c) What is the most pocket money Brett can get per week?
.....
- 3 The Thompson family have this rule for the amount of pocket money for their children : $p = 3 \times (y - 8)$ (where y is the age of the child in years).
 - a) Wendy Thompson is 14 years old. How much pocket money does she get?
 - b) At what age did the Thompson kids receive pocket money for the first time?
- 4 Sasha and Maria earn their pocket money by washing cars for neighbours. They get \$6 per car. Write a formula for Sasha's pocket money after they have together washed n cars.



$p =$

B Squares, Dots and Lines

- 1a) Study this pattern, count squares and dots.



1 square 2 squares squares
6 dots 9 dots dots

- b) Find the last three numbers in the table by studying the pattern in the bottom line.

No. of squares, S	1	2	3	4	5	6
number of dots, D	6	9	12			

- c) Sarah said, "If you multiply the number of squares by 3, then add 3, you get the number of dots."

Check Sarah's rule with 5 squares.

..... \times + = Correct?

- d) Write Sarah's rule using the letters S and D.

$D =$

- e) Predict the number of dots in a diagram with 20 squares.

.....

- 2 Look at the pattern in question 1 again. This time count squares and lines.

- a) The first diagram has 1 square, 6 lines; the second diagram has 2 squares, 10 lines. Complete the table.

No. of squares, S	1	2	3	4	5	6
number of lines, L	6	10				

- b) Rule : If you multiply the number of squares with, then add you get the number of lines.

Check the rule with 5 squares.

.....

- c) Write the rule using the letters S and L.

$L =$

- d) Predict the number of dots in a diagram with 20 squares.

.....